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(54) Title: METHOD, CARD AND TERMINALS FOR CARRYING OUT TRANSACTIONS IN A TELECOMMUNICATION NETWORK

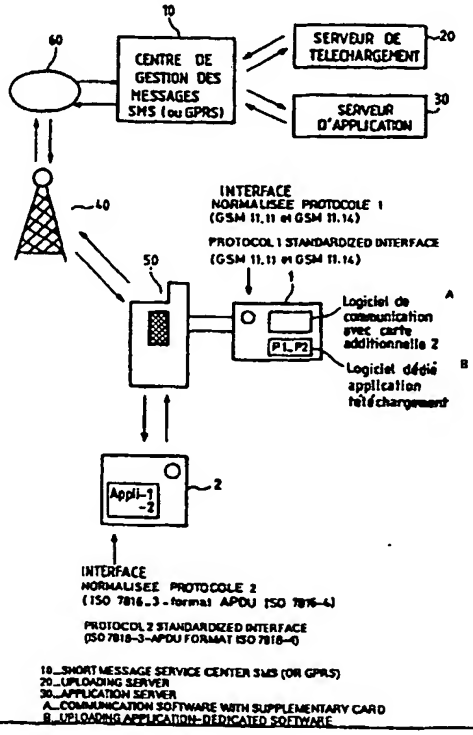
(54) Titre: PROCEDE, CARTE A PUCE ET TERMINAUX POUR EFFECTUER DES TRANSACTIONS A TRAVERS UN RESEAU DE TELECOMMUNICATION

(57) Abstract

The invention concerns a method for carrying out transactions through a telecommunication network (60) using a smart card (1, 2) and telecommunication terminals (50) provided with at least two smart card reading interfaces, one for receiving a subscriber's identification smart card (1) dedicated to the telephone system, the other for receiving a smart card (2) dedicated to one or several applications other than the telephone system. The invention is characterised in that communication means are inserted in a subscriber's card (1) to enable him to drive any application card (2) through the telecommunication terminal (50).

(57) Abrégé

L'invention concerne un procédé pour effectuer des transactions à travers un réseau de télécommunication (60) au moyen de cartes à puce (1, 2) et de terminaux de télécommunication (50) munis d'au moins deux interfaces de lecture de cartes à puce, l'une pour recevoir une carte à puce d'identification d'abonné (1) dédiée à la téléphonie, l'autre pour recevoir une carte à puce (2) dédiée à une ou plusieurs applications autres que la téléphonie. Il est prévu selon l'invention d'introduire des moyens de communication à toute carte d'identification d'abonné (1) pour lui permettre de piloter toute carte applicative (2) à travers le terminal de télécommunication (50).



ABSTRACT

The invention relates to method for effecting transactions through a telecommunication network (60) by means of smart cards (1, 2) and telecommunication terminals (50) provided with at least two smart card reading interfaces, one for receiving a subscriber identification smart card (1) dedicated to telephony, the other for receiving a smart card (2) dedicated to one or more applications other than telephony. Provision is made according to the invention for introducing means of communication to any subscriber identification card (1) to enable it to control any application card (2) through the telecommunication terminal (50).

Figure 1

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A METHOD, A SMART CARD AND TERMINALS FOR EFFECTING TRANSACTIONS THROUGH A TELECOMMUNICATION NETWORK

The invention relates to a method for effecting transactions through a telecommunications network by means of a smart card and telecommunication terminals.

It also relates to smart cards and terminals for implementing the method.

It finds many applications in monetary transactions, electronic purses and transactions relating to health and gaming.

The telecommunications networks concerned are all networks liable to be used by a telephone subscriber in order to have access to another subscriber or to services.

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Amongst these networks, telephone networks, switched networks or ISDN and cellular telephone networks can be cited.

The new generation of telecommunication terminals provides for these terminals to be equipped with two smart card reading interfaces, one for communicating with a subscriber identification smart card dedicated to telephony, such as for example SIM (Subscriber Identity Module) cards in the case of the cellular telecommunication system and the other for a smart card (application card) dedicated to one or more applications such as telephony. It may for example be a case of an electronic purse card.

Smart cards dedicated to one or more applications other than telephony can be issued by completely independent operators and communication with these applications cards is established in accordance with distinct protocols.

It consequently proves necessary for this new generation of telecommunication terminals to support sets of commands applying these different types of applications cards (for example banking application or loyalty application).

This is very constraining for service providers who must because of this be bound to a terminal manufacturer in order to offer their applications to their customers.

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In addition, this imposes a limitation in the choice of application cards which can be used with a given telecommunication terminal, to those which were provided initially, otherwise it would be necessary to modify the terminal software.

The present invention alleviates these problems.

According to one aspect of the present invention there is provided a method for effecting transactions through a telecommunication network by means of smart cards and telecommunication terminals for access to the network provided with at least two smart card reading interfaces, one for receiving a subscriber identification smart card dedicated to telephony, the other for receiving an additional smart card dedicated to one or more applications other than telephony; wherein the subscriber identification smart card communicates with the additional card via the terminal, by means of a set of commands intended to control the said additional card, these commands being preformatted by the subscriber identification card according to the format of the communication protocol of the additional card and transmitted by the terminal in accordance with the transportation protocol of the latter.

According to a further aspect of the present invention there is provided a subscriber identification telephone smart card, including means for communicating with an additional card dedicated to one or more applications other than telephony, via a telecommunication terminal provided with at least two smart card reading interfaces, one for receiving the subscriber identification smart card dedicated to telephony and the other for receiving the additional

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smart card, these means including a set of commands intended to control the additional card, the said commands being preformatted by the subscriber identification card in accordance with the format (APDU) of the communication protocol of the additional card and transmitted by the terminal in accordance with the transportation protocol of the latter.

According to a still further aspect of the present invention there is provided a telecommunication terminal for access to a network provided with at least two smart card reading interfaces, one for receiving a subscriber identification smart card dedicated to telephony, the other for receiving an additional smart card dedicated to one or more applications other than telephony, said terminal including:

- means adapted for receiving commands sent by the subscriber identification card according to the transportation protocol of the said terminal and intended to control the additional card, the said commands being preformatted by the subscriber identification card according to the format of the communication protocol of the additional card,

- means for transmitting, amongst these commands, the commands send incoming/outgoing command card 2" to the additional card as preformatted,

- means for executing, amongst these commands, the commands switch card 2 on/off',

- means for sending a command "card 2 present" to the subscriber identification card.

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The present invention may avoid burdening the communication logic interfaces of the terminal whilst enabling it to accept any application card, by introducing communication means to any subscriber identification card dedicated to telephony to enable it to control any application card through the telecommunication terminal.

A preferred embodiment of the present invention will now be described with reference to the accompanying drawings wherein:-

- Figure 1 depicts schematically an overall view of a telecommunication network for implementing the method of the invention,

- Figure 2 depicts in more detail and schematically a subscriber identification card and an additional card,

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- Figure 3 illustrates in detail the exchanges between the different elements of the system in the case of an incoming or outgoing command in accordance with the method,

- Figure 4 illustrates in a more general fashion the exchanges between the different elements for all the commands.

As stated, the principle of the invention applies to any type of telephony network, switched telephone network, ISDN or cellular (GSM) network. However, the following description is given for a cellular telecommunication network in which the terminals are mobile radio telephones.

According to this example illustrated by Figure 1 the system has:

- a centre 10 for managing the messages, SMS (Short Message Service Centre) or GPRS (Global Packet Radio Service);

- a downloading server 20 containing the programs dedicated to the implementation of applications,

- an application server 30: electronic purse, bank, loyalty points given by a merchant;

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- a GSM network 60 containing at least one cellular terminal 40. Each terminal enables the user to be connected to the network of the operator;

- a mobile telephone 50 of the user. A mobile telephone is composed of a reception antenna, a battery, a display screen, a keypad, one or more card interfaces and a microprocessor containing a system software package.

In the present invention, the mobile telephone is provided with two smart card interfaces

- a subscriber identification card 1 referred to as an SIM card. This card is present in the mobile telephone of the user and enables him to be identified by the cellular telephony operator,

- an additional card 2 referred to as an application card since it is intended for applications of a type other than the application of the SIM card. These applications can be electronic purse, bank or loyalty point applications.

Figure 2 depicts the elements contained in the SIM card 1 and in the additional card 2 in order to implement the invention.

The SIM card 1 contains a microprocessor, a read only memory (ROM), a random access memory (RAM) and a memory of the EEPROM type. The read only memory (ROM)

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and EEPROM memory contain software and data enabling the SIM card to operate. It is a case notably of system software and one or more downloaded programs P1-P2 dedicated to the implementation of applications by the additional card. Each program dedicated to the application implementation contains one or more applications for the additional card. These applications correspond to the management of the man machine interface with the user, to the management of the communication with the additional card and the management of the communication with the application server 30 linked to the additional card.

The communication software of the SIM card uses the set of commands possessed by the SIM card in order to dialogue with the additional card 2 through the terminal.

This set of commands has preformatted commands in accordance with the APDU format (ISO-7816-4), which is the format of the communication protocol of the card 2. These commands are encapsulated by the SIM card in accordance with the transportation protocol GSM 11.14 and transmitted in accordance with this protocol by the terminal (the commands sent by the SIM card are read by the terminal).

More precisely, the SIM card 1 has the four following commands available:

a) - "switch on card 2"

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b) - "switch off card 2".

c) - "send incoming command to card 2"

d) - "send outgoing command to card 2".

The first two, a), b), are executed by the terminal, the other two, c) and d), are communicated in APDU format to the card 2.

A diagram illustrating the different exchanges in more detail is illustrated below with regard to Figure 3.

The additional card 2 (application card) is composed of a microprocessor, a read only memory (ROM), a random access memory (RAM) and a memory of the EEPROM type. The read only memory (ROM) and EEPROM memory contain software and data for the operation of this application card, notably system software and applications software (for example electronic purse software and/or loyalty points management software etc).

The terminal, which is a mobile telephone according to this example, allows the insertion of two cards. For this purpose it has two smart card reading interfaces. The first interface allows insertion of the SIM card identifying the user of the telephone on the network to which it is connected. The additional card interface or interfaces enable the user to insert cards of another type (bank card, loyalty card, health card, etc).

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The terminal also has elements which are not shown, such as a microprocessor and a program memory containing system software and communication software.

This communication software is according to the invention able to receive the commands sent by the SIM card.

This software also makes it possible to transmit to the card 2 incoming/outgoing commands as preformatted, that is to say to transmit them in the APDU format, to execute the switch on/off card 2 commands and to send a "card 2 present" command to the SIM card as soon as the mobile telephone has detected the presence of a card 2 in its reader. The detection can be mechanical or electrical. This command is sent to the SIM card in accordance with the GSM 11.14 communication protocol.

Details will now be given of the dialogue between the elements of the system from the diagram in Figure 3 in the case of an incoming or outgoing command sent by the SIM card for the additional card 2. An incoming command is typically a write command given to the card 2, this card being accompanied by data to be written.

An outgoing command is typically a read command given to the card 2.

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. at step I, the SIM card encapsulates the APDU format command (ISO-7816-4) in an SIM TOOLKIT command of the standard GSM 11.14,

. at step II, the terminal recovers the APDU command and communicates it to the additional card 2,

. at step III, the additional card 2 sends a return code SW1/SW2 in the APDU format to the terminal. This code is provided with data in the case of an outgoing command,

. at step IV, the terminal prepares the "Terminal Response" TR and sends the response to the SIM card with the return code,

. at step V, the SIM card processes the response in the case of good reception, or otherwise recommences as from step I.

Figure 4 illustrates the essential commands used to establish a dialogue between the SIM card and the additional card - card 2 - through the terminal.

The command "card 2 present" is sent by the terminal. The other four commands are sent by the SIM card for the terminal which reads them. The command "Switch On Card 2" is executed by the terminal and results in an order RESET sent to the card 2. The command "Switch Off Card 2" is executed by the

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terminal, which for this purpose no longer supplies current to the card 2.

The card 2 incoming/outgoing commands have already been detailed from the diagram in Figure 3.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method for effecting transactions through a telecommunication network by means of smart cards and telecommunication terminals for access to the network provided with at least two smart card reading interfaces, one for receiving a subscriber identification smart card dedicated to telephony, the other for receiving an additional smart card dedicated to one or more applications other than telephony; wherein the subscriber identification smart card communicates with the additional card via the terminal, by means of a set of commands intended to control the said additional card, these commands being preformatted by the subscriber identification card according to the format of the communication protocol of the additional card and transmitted by the terminal in accordance with the transportation protocol of the latter.

2. A method for effecting transactions according to Claim 1, characterized in that the set of commands has at least the following commands:

- energising the additional card "switch on card 2",
- de-energising the additional card "switch off card 2",
- sending data to additional card "send incoming command to card 2",
- receiving data from the additional card "send outgoing command to card 2".

3. A method according to Claim 1 or 2, characterised in that the communication with the additional card via the terminal has an additional command sent by the terminal to the subscriber identification card in accordance with the communication protocol thereof, this command being:

- presence of the additional card "card 2 present".

4. A method according to any one of the preceding claims, characterised in that the communication with the additional card via the terminal is implemented by a program loaded into a program memory of the subscriber identification card.

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5. A method according to any one of the preceding claims, characterised in that the subscriber identification card is able to control the downloading through the terminal, into its own program memory, of one or more programs dedicated to the use of applications for the additional card, these dedicated programs coming from an application downloading server accessible through the terminals by means of the telecommunications network.

6. A method according to any one of the preceding claims, characterised in that the telephone network is the mobile radio telephony network (GSM), the terminals being radio telephones and the subscriber identification cards being SIM cards.

7. A method according to any one of Claims 1 to 4, characterised in that the telephone network is the switched telephone network or integrated services digital network (ISDN).

8. A subscriber identification telephone smart card, including means for communicating with an additional card dedicated to one or more applications other than telephony, via a telecommunication terminal provided with at least two smart card reading interfaces, one for receiving the subscriber identification smart card dedicated to telephony and the other for receiving the additional smart card, these means including a set of commands intended to control the additional card, the said commands being preformatted by the subscriber identification card in accordance with the format (APDU) of the communication protocol of the additional card and transmitted by the terminal in accordance with the transportation protocol of the latter.

9. A subscriber identification telephone smart card according to Claim 8, characterised in that it has a program memory containing a program adapted for controlling the downloading through the terminal into this memory, of one or more programs dedicated to the use of applications for the additional card, these programs coming from a downloading server accessible through the terminals by means of the telecommunication network.

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10. A subscriber identification telephone smart card according to Claim 9, characterised in that the dedicated programs downloaded into the subscriber identification card have one or more applications for the additional card, these applications corresponding to the management of the man machine interface with the user, the management of the communication with the said additional card and the management of the communication with the application server linked to this additional card.

11. A telecommunication terminal for access to a network provided with at least two smart card reading interfaces, one for receiving a subscriber identification smart card dedicated to telephony, the other for receiving an additional smart card dedicated to one or more applications other than telephony, said terminal including:

- means adapted for receiving commands sent by the subscriber identification card according to the transportation protocol of the said terminal and intended to control the additional card, the said commands being preformatted by the subscriber identification card according to the format of the communication protocol of the additional card,
- means for transmitting, amongst these commands, the commands send incoming/outgoing command card 2" to the additional card as preformatted,
- means for executing, amongst these commands, the commands switch card 2 on/off",
- means for sending a command "card 2 present" to the subscriber identification card.

12. A telecommunication terminal according to Claim 11, characterised in that the commands sent by the subscriber identification card are encapsulated according to the transportation protocol of the telecommunication terminal, the terminal being able to recover the preformatted data thus received in order to transmit them to the additional card in accordance with its communication protocol.

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13. A telephony terminal according to Claim 10, characterised in that the protocol for transportation between the terminal and the subscriber identification card is defined by the standard GSM 11.14 and in that the protocol for communication with the additional card follows the APDU format (ISO 7816-4).

14. A method for effecting transactions through a telecommunication network substantially as herein described with reference to the accompanying drawings.

15. A subscriber identification telephone smart card substantially as herein described with reference to the accompanying drawings.

16. A telecommunication terminal for access to a network substantially as herein described with reference to the accompanying drawings.

DATED: 18 October, 2000
PHILLIPS ORMONDE & FITZPATRICK
Attorneys for:
THOMSON LICENSING S.A.

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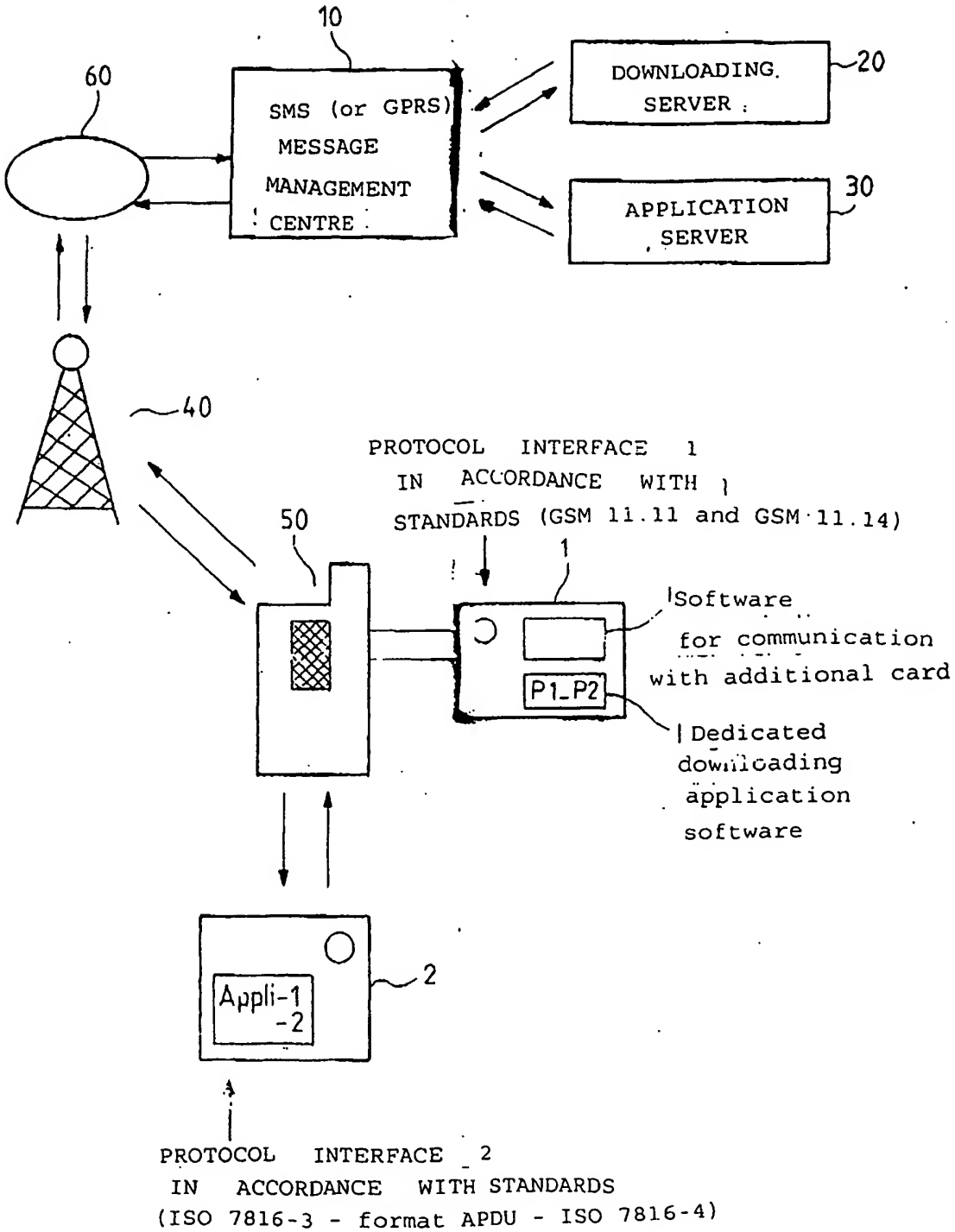

10
60
SMS (or GPRS) MESSAGE MANAGEMENT CENTRE
DOWNLOADING SERVER
20
APPLICATION SERVER
30
40
PROTOCOL INTERFACE 1
IN ACCORDANCE WITH
STANDARDS (GSM 11.11 and GSM 11.14)
50
1
Software for communication with additional card
P1_P2
Dedicated downloading application software
Appli-1 -2
2
PROTOCOL INTERFACE 2
IN ACCORDANCE WITH STANDARDS
(ISO 7816-3 - format APDU - ISO 7816-4)

FIG 1

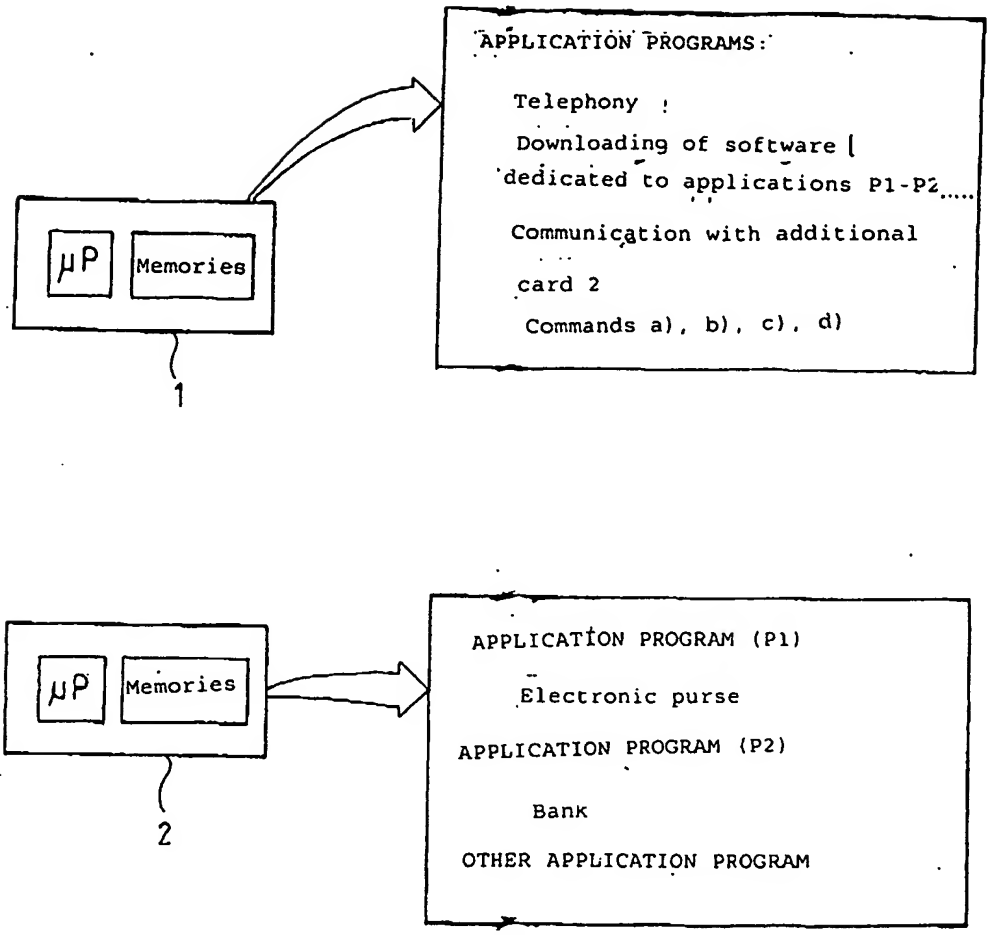

APPLICATION PROGRAMS:
Telephony
Downloading of software dedicated to applications P1-P2
Communication with additional card 2
Commands a), b), c), d)
µP
Memories
1
µP
Memories
2
APPLICATION PROGRAM (P1)
Electronic purse
APPLICATION PROGRAM (P2)
Bank
OTHER APPLICATION PROGRAM

FIG_2

FIG_3

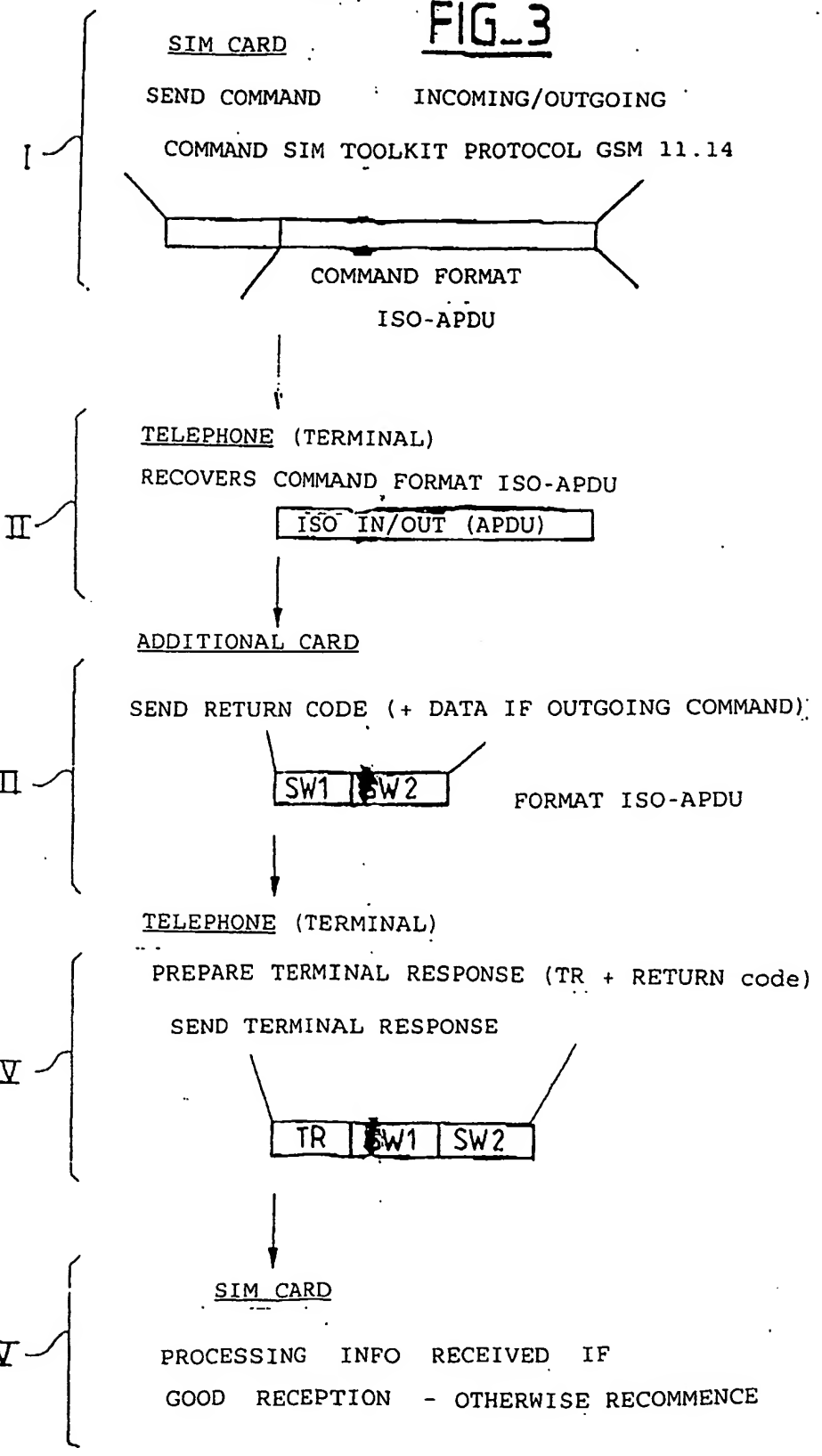
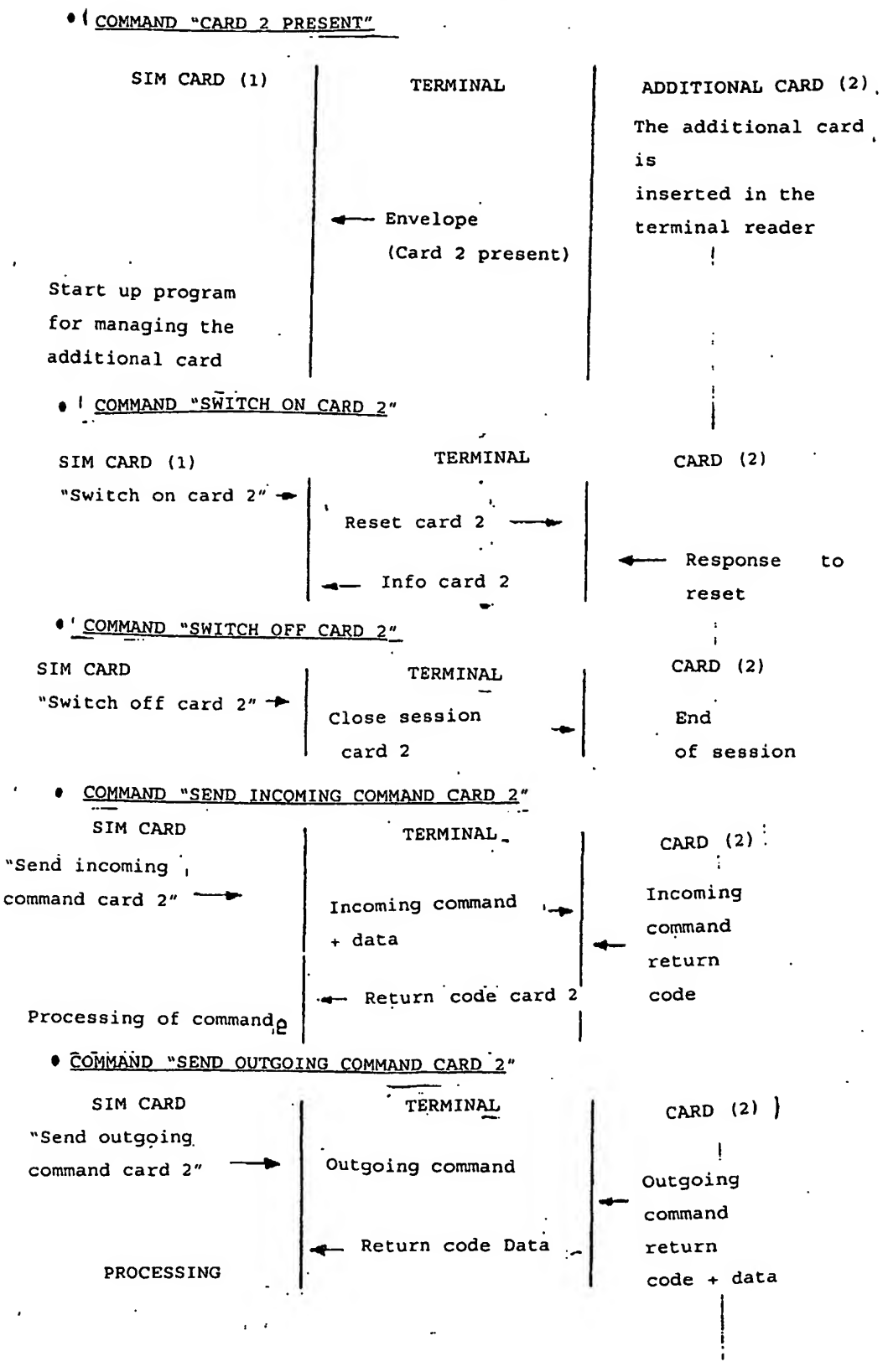

I
SIM CARD
SEND COMMAND
INCOMING/OUTGOING
COMMAND SIM TOOLKIT PROTOCOL GSM 11.14
COMMAND FORMAT
ISO-APDU
II
TELEPHONE (TERMINAL)
RECOVERS COMMAND FORMAT ISO-APDU
ISO IN/OUT (APDU)
ADDITIONAL CARD
III
SEND RETURN CODE (+ DATA IF OUTGOING COMMAND)
SW1
SW2
FORMAT ISO-APDU
TELEPHONE (TERMINAL)
IV
PREPARE TERMINAL RESPONSE (TR + RETURN code)
SEND TERMINAL RESPONSE
TR
SW1
SW2
V
SIM CARD
PROCESSING INFO RECEIVED IF
GOOD RECEPTION - OTHERWISE RECOMMENCE

FIG.4


COMMAND "CARD 2 PRESENT"
SIM CARD (1)
TERMINAL
ADDITIONAL CARD (2)
The additional card is inserted in the terminal reader
Envelope (Card 2 present)
Start up program for managing the additional card
COMMAND "SWITCH ON CARD 2"
SIM CARD (1)
TERMINAL
CARD (2)
"Switch on card 2"
Reset card 2
Response to reset
Info card 2
COMMAND "SWITCH OFF CARD 2"
SIM CARD
TERMINAL
CARD (2)
"Switch off card 2"
Close session card 2
End of session
COMMAND "SEND INCOMING COMMAND CARD 2"
SIM CARD
TERMINAL
CARD (2)
"Send incoming command card 2"
Incoming command + data
Incoming command return code
Return code card 2
Processing of command
COMMAND "SEND OUTGOING COMMAND CARD 2"
SIM CARD
TERMINAL
CARD (2)
"Send outgoing command card 2"
Outgoing command
Outgoing command return code + data
Return code Data
PROCESSING

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